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10/840,240	05/07/2004	Jin-Ook Kim	053785-5182	7617

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MORGAN LEWIS & BOCKIUS LLP
1111 PENNSYLVANIA AVENUE NW
WASHINGTON, DC 20004

EXAMINER	
YI, STELLA KIM	
ART UNIT	PAPER NUMBER
1791	
MAIL DATE	DELIVERY MODE
04/22/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/840,240	KIM, JIN-OOK	
	Examiner	Art Unit	
	Stella Yi	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 March 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 16, 2010 has been entered.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over NISHIKAWA et al. (6,063,527) and in view of XIA et al. ("Soft Lithography." Angew. Chem. Int. Ed., 1998, pp.550-575) and in further view of SONG et al. (2001/0019382).

Regarding claims 1-20, NISHIKAWA et al. discloses a method for making a color filter for a liquid crystal display device, comprising the steps of: Col.7, line 63 through Col.10, line 3:

(1) providing a removable mold 13 having an intaglio surface with a plurality of groove units formed therein, the groove units being arranged in predetermined pattern (Fig.1B);

(2) attaching the removable mold to a transparent substrate, thereby the intaglio surface and the transparent substrate 10 cooperatively forming a plurality of channel units (Fig.1C) (i.e. groove and substrate constitute a channel);

(3) injecting the said channel units with a photopolymer solution containing colorants (Col.11, lines 15-29);

(4) the said groove units are separated by partition walls, and the groove units comprises three types of grooves which are injected with corresponding red-colored, green-colored, and blue-colored photopolymer sub-pixel solution, respectively (Col.11, lines 23-51);

(5) applying an ultraviolet light to the said photopolymer solution through the transparent substrate 10 so as to cure the photopolymer to the transparent substrate (Col.9, lines 52-63; Fig.1C); and

(6) removing the removable mold with the patterned photopolymer layer formed on the transparent substrate (Fig.1D).

Steps (1) and (6) corresponds to instant claims 1, 11, and 16 where a removable mold with grooves is being used. Steps (2)-(4) corresponds with instant claims 2, 11, and 16 where channels of the mold are filled with color resin. Step (5) corresponds with instant claims 3, 13, 16, and 19 where curing each of the color resin in the sub-color filters are done by irradiating light which gives off heat. In addition to instant claim 16, it

is known to one of ordinary skill in the art that color liquid crystal display devices include an active matrix substrate on which a plurality of active elements are formed, a color filter substrate on which color filter layers of different colors and a common electrode are deposited in this order. Regarding claim 8, the said method further comprises forming a black matrix over the said substrate (Col.5, lines 60-63).

NISHIKAWA et al. does not appear to explicitly disclose using three molds or using the one-mold multiple times, made of polydimethylsiloxane (PDMS) to form the said color filter where the channels are filled with color resin by capillary action; and is silent to the second groove width being greater than the first groove but smaller than the third groove.

However, XIA et al. discloses a polydimethylsiloxane (PDMS) mold having relief structures that form a network of empty channels to be filled with a liquid prepolymer by capillary action. This is a soft lithography method known as "micromolding in capillaries". The steps of this method is illustrated in Figure 1 below (XIA et al. p.562):

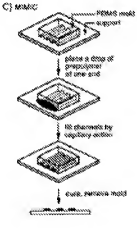

Figure 1

This method corresponds to instant claims 1, 5, 6, 10, 11, 14, and 16. In view of XIA et al.'s method of micromolding in capillaries, it would have been obvious to one of ordinary skill in the art to use the PDMS mold three times or use three PDMS molds in order to form three different sub-color filters with three different color resins, as required by NISHIKAWA et al.

The PDMS mold is an elastomer. The elasticity and low surface energy of the PDMS mold allows it to be detached easily from surfaces. It is also optically transparent down to about 300 nm in order to allow UV light to cure resin (XIA et al. pp.556, 562). This corresponds to instant claims 3, 4, 11, 12, 13, 17, 18, and 19. Also, the elastomeric mold offers the opportunity to manipulate the size and shape of features present on the mold so as to give different shapes to the injected resin or polymer in the mold such as a stripe shape. The cured polymers, therefore, possess almost the exact dimensions and shapes of the channels in the surface of the PDMS mold (XIA et al. p.567). This corresponds to instant claims 7 and 15.

XIA et al. teach the said elastomeric mold offers the opportunity to manipulate the size and shape of features present on the mold by mechanical deformation (pg.562). XIA et al. illustrates in figure below, that the width of the mold can be varied:

Figure 18. AFM images of chromium structures on a master and a PU replica prepared from a PDMS mold cast from this master.[44] The width is given in micrometers; the depth and height are given in nanometers.

It would have been obvious to one of ordinary skill in the art to have conducted routine experimentation to determine the optimum volume for each groove wherein second groove volume size is between the volume sizes of the first groove and the third groove based on the teachings of XIA et al. This corresponds to instant claims 1, 11, and 16.

NISHIKAWA et al. and XIA et al. are analogous art because they are from the same field of endeavor, that is microfabrication technology. At the time of the invention, one of ordinary skill in the art would have been motivated to modify the method of forming color filters for liquid crystal display devices of NISHIKAWA et al. to include the micromolding in capillaries method from XIA et al. because XIA et al. suggests that the use of soft lithography may be practical from display devices and that patterning techniques such as micromolding in capillaries have potential for application in emerging technologies or in high-resolution patterning (XIA et al. p.570). XIA et al.'s purpose for developing the use of soft lithography/micromolding in capillaries for the technology of microfabrication is to provide a convenient and inexpensive method to pattern small or large surfaces of substrates. The object of NISHIKAWA et al. invention is to provide a method for making a color filter for use in a liquid crystal display, which is simple and has a minimized manufacturing cost (Col.1, lines 5-7; Col.3, lines 6-15). XIA et al. suggests the method for liquid crystal displays and patterning, and NISHIKAWA et al. provides a display with a patterned layer. Therefore, the method of forming color filter layer for liquid crystal display device in instant claims 1-20 would have been obvious at the time the invention was made.

Modified NISHIKAWA et al. by XIA et al. is silent to the first and second color filters being used as a sidewall for the next color filters. However, SONG et al. teach that liquid crystal display devices are made of red, green, and blue color filters that are arranged in a stripe shape as illustrated in Figure 5 (Page 3, [0040]). As seen in Figure 5, the first color filter (R) is used as a sidewall for the second color filter (G) and (G) is used as a sidewall for color filter (B). Therefore, it would have been obvious to one of ordinary skill in the art to have substituted the stripe shaped color filter of SONG et al. for the color filter of NISHIKAWA et al. modified by XIA et al. in order to produce the stripe shape color filter for a liquid crystal display device. Also, it would have been a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular stripe shaped color filter was significant.

Modified NISHIKAWA et al. by XIA et al. is silent to the second and third mold used as the other sidewalls of the channels. However, NISHIKAWA et al. modified by XIA et al. teach the micromolding in capillaries for the technology of microfabrication to provide a convenient and inexpensive method to pattern small or large surfaces of substrates and that it would have been obvious to one of ordinary skill in the art to use the said PDMS mold three times or use three PDMS molds in order to form three different sub-color filters with three different color resins, as required by NISHIKAWA et al. to produce the said stripe shape of SONG et al. where the sidewalls of each color-filters are touching. In other words, it would have been obvious to one of ordinary skill in the art to use the PDMS mold of XIA et al. three times to produce the three different stripe color-filter of SONG et al. wherein the removable mold can be used as the other

sidewall or the sidewall opposite of the said color-filter sidewall in order to produce the stripe shape color-filter of SONG et al. comprising three different color resins by the capillary action taught by XIA et al.

NISHIKAWA et al. and XIA et al. are analogous art because they are from the same field of endeavor, that is microfabrication technology. At the time of the invention, one of ordinary skill in the art would have been motivated to modify the method of forming color filters for liquid crystal display devices of NISHIKAWA et al. to include the micromolding in capillaries method from XIA et al. because XIA et al. suggests that the use of soft lithography may be practical from display devices and that patterning techniques such as micromolding in capillaries have potential for application in emerging technologies or in high-resolution patterning (XIA et al. p.570). XIA et al.'s purpose for developing the use of soft lithography/micromolding in capillaries for the technology of microfabrication is to provide a convenient and inexpensive method to pattern small or large surfaces of substrates. The object of NISHIKAWA et al. invention is to provide a method for making a color filter for use in a liquid crystal display, which is simple and has a minimized manufacturing cost (Col.1, lines 5-7; Col.3, lines 6-15). XIA et al. suggests the method for liquid crystal displays and patterning, and NISHIKAWA et al. provides a display with a patterned layer. Therefore, the method of forming color filter layer for liquid crystal display device in instant claims 1-20 would have been obvious at the time the invention was made.

Response to Arguments

1. Applicant's arguments filed 03/16/2010 have been fully considered but they are not persuasive.

Applicant argues the amended claims 1, 11, and 16.

Examiner respectfully disagrees with the Applicant's above arguments and would like to point out the reason(s) as discussed in the rejection:

Modified NISHIKAWA et al. by XIA et al. is silent to the second and third mold used as the other sidewalls of the channels. However, NISHIKAWA et al. modified by XIA et al. teach the micromolding in capillaries for the technology of microfabrication to provide a convenient and inexpensive method to pattern small or large surfaces of substrates and that it would have been obvious to one of ordinary skill in the art to use the said PDMS mold three times or use three PDMS molds in order to form three different sub-color filters with three different color resins, as required by NISHIKAWA et al. to produce the said stripe shape of SONG et al. where the sidewalls of each color-filters are touching. In other words, it would have been obvious to one of ordinary skill in the art to use the PDMS mold of XIA et al. three times to produce the three different stripe color-filter of SONG et al. wherein the removable mold can be used as the other sidewall or the sidewall opposite of the said color-filter sidewall in order to produce the stripe shape color-filter of SONG et al. comprising three different color resins by the capillary action taught by XIA et al.

NISHIKAWA et al. and XIA et al. are analogous art because they are from the same field of endeavor, that is microfabrication technology. At the time of the invention,

one of ordinary skill in the art would have been motivated to modify the method of forming color filters for liquid crystal display devices of NISHIKAWA et al. to include the micromolding in capillaries method from XIA et al. because XIA et al. suggests that the use of soft lithography may be practical from display devices and that patterning techniques such as micromolding in capillaries have potential for application in emerging technologies or in high-resolution patterning (XIA et al. p.570). XIA et al.'s purpose for developing the use of soft lithography/micromolding in capillaries for the technology of microfabrication is to provide a convenient and inexpensive method to pattern small or large surfaces of substrates. The object of NISHIKAWA et al. invention is to provide a method for making a color filter for use in a liquid crystal display, which is simple and has a minimized manufacturing cost (Col.1, lines 5-7; Col.3, lines 6-15). XIA et al. suggests the method for liquid crystal displays and patterning, and NISHIKAWA et al. provides a display with a patterned layer. Therefore, the method of forming color filter layer for liquid crystal display device in instant claims 1-20 would have been obvious at the time the invention was made.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stella Yi whose telephone number is 571-270-5123. The examiner can normally be reached on Monday - Thursday from 8:00 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on 571-272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SY

/Jeff Wollschlager/
Primary Examiner, Art Unit 1791